Sea to Sky Highway
British Columbia Highway 99

Site Visit
August 1, 2007

Presentation developed by J. Mahoney, University of Washington
General Information

• 95 km long section of Highway 99 from West Vancouver to Whistler.
• British Columbia Ministry of Transportation (MoT) wanted to:
  – Improve safety, reliability, and capacity.
  – Complete work during 2009 (for 2010 Winter Olympics).
  – Achieve these improvements via a performance based Design-Build-Finance-Operate (DBFO) public private partnership.
• Total cost: ~ $800 million
General Information

- S2S Transportation Group began construction August 2005 and will finish fall 2009.
- Total time to design and build ~ 4 to 5 years.
- Financing
  - Required outside financing.
  - 80% of future revenue based on lane availability.
  - 17 banks involved.
General Information

• To be added
  – 48 new bridges/interchanges
  – 219 MSE walls
  – 2.4 million m³ of earthwork
  – 450,000 tonnes of HMA (HMA design thickness is 125 mm).

• Maintenance
  – To be maintained by Miller-Capilano
  – They plan to resurface the route twice over a 25 year span.

• Kiewit spent ~ $50 million on new equipment for this project with about 250 pieces of equipment.
Existing conditions on BC 99

- Current ADT ~ 13,000 vpd.
- Projected to be ~ 22,000 vpd in 2025.
- Route is largely 2 lanes at this time; although, some sections of the highway have been improved.
Highway 99 and the Coast Range

(This portion of the Coast Range is generally considered to extend from the Fraser River north to Alaska and is part of the larger Coast Belt. The rock in this belt is mostly granitic with some metamorphic—similar to the Cascades to the south.)

Selected Quantities for S2S Transportation Group under the current contractual arrangements (work is split into 4 segments with Segment 1 at the south end of the project and Segment 4 near Whistler)

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>69.8 km</td>
</tr>
<tr>
<td>Rock excavation</td>
<td>1,130,000 m³</td>
</tr>
<tr>
<td>Mechanically Stabilized Embankment (MSE)</td>
<td>58,300 m²</td>
</tr>
<tr>
<td>Gravel</td>
<td>1,159,000 tonnes</td>
</tr>
<tr>
<td>Hot mix asphalt</td>
<td>377,000 tonnes</td>
</tr>
<tr>
<td>Portland cement concrete</td>
<td>32,700 m³</td>
</tr>
</tbody>
</table>
Photo taken from overland cut section looking down on existing highway (Segment 1—Horseshoe Bay to Sunset). View toward northwest.
Holes drilled—ready to load with ANFO mixture (overland cut, Segment 1—Horseshoe Bay to Sunset). ANFO: ammonium nitrate and fuel oil.
Drilling blast holes with Tamrock 800 (Howe Sound in the background) at overland cut (Segment 1—Horseshoe Bay to Sunset).
Dust collector system on the Tamrock 800.
Cat 321C backhoe
Loading and hauling in Eagleridge overland cut (Segment 1—Horseshoe Bay to Sunset)
Spreading fill and compacting in Eagleridge overland cut (Segment 1—Horseshoe Bay to Sunset). Howe Sound in the background with Vancouver Island in the distance. View toward southwest.
Cat CP-563D compactor in Eagleridge overland cut (Segment 1—Horseshoe Bay to Sunset).
Route down to existing highway—overland cut segment. North view.
Overland cut will tie to the existing highway here. Final grade about 8%. View to the south.
Portable rock crusher.
A portion of the highway widening is via new bridge structures.
This photo illustrates some of the retaining walls being constructed.
Mechanically Stabilized Embankment
Mechanically Stabilized Embankment

Face rock is 6 in. plus size (with a 2 ft width. Fabric separates the face rock from the remainder of the rock fill.

Wall specification calls for no deviations more than 1 inch per 10 ft.

Majority of rock fill 6 in. minus.
Mechanically Stabilized Embankment

Dumping of 6” minus aggregate for MSE fill material.
Major rock cut south of Squamish
Vicinity of Squamish

Bridge expansion in Squamish. Stawamus Chief (often referred to as “The Chief”), in the distance—this rock formation is a 95 million year old magma chamber of an ancient volcano and is the world’s second largest granite monolith. Rounded shape is due to glacial action over 10,000 years ago.
Bridge expansion in Squamish requires relocation of utilities—shown here are existing sewer and water lines.
HMA paving near Squamish. Source of aggregate at Kiewit crushing operation just north of Squamish.
Kiewit crushing operation near Squamish

Kiewit crushing operation includes two cone crushers. Mt. Garibaldi is shown in the background. This mountain is a stratovolcano in that it is made up of layers of eruptive material (like Mt. Baker, Mt. Rainier, etc). It is composed almost exclusively of dacite. Elevation 2,678 m (8,786 ft.). View to the northeast.
Bridge construction at Daisy Lake
Kiewit Construction—Thanks to the company for the excellent orientation to their Sea to Sky Highway project. Specific appreciation is extended to Darren Seaman, Russ Constable, and Christi Pilutik from the Kiewit Vancouver, WA offices.
The End